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Rejuvenation Instructions Cutting a Novinium™ treated cable

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- Ultrinium™ sustained pressure injection method (U.S. Patent 7,615,247)
- Ultrinium™ formulation optimization injection method (U.S. Patent 7,611,748)
- Injection Adaptor (U.S. Patent 7,195,504 and 7,538,274)
- Perfectium™ single switch injection (U.S. Patent 7,353,601)
- Predicting performance of Electrical Power cables (patent pending)
- Formulation of Ultrinium™ & Perficio™ components (patents pending)
- N-Rex™ submarine cable injection process (patent pending)
- N-Ter™ injection or Novinium thermally enhanced rejuvenation (patent pending)
- Reticular Flash Preventer (RFP) provides safer operation of conventional injection elbows (patent pending)

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Cutting a Treated Cable

The Novinium™ injection process provides the highest level of post-injection reliability. There may be occasional dielectric failures of the cable or component failures which require the attention of utility line personnel. This instruction provides guidance for the safe handling of such circumstances with Novinium™ technology. **Under no circumstances should these instructions be relied upon for older non-Novinium technologies. The much higher flammability may create additional risks not addressed by these instructions.** The purpose of these instructions is to guide line personnel in procedures, which will avoid contact of Novinium™ fluid with eyes, skin and the environment. These instructions supplement the information provided in the material safety data sheets (MSDS) for the fluids. The most current MSDS for Novinium™ brand injection fluids may be found at <http://www.novinium.com/solutions.aspx> under the MSDS tab. All cable must be de-energized, tested and grounded. Where the proposed cut is not immediately adjacent to a grounded conductor the cable must be cut or spiked remotely.

Required Safety Equipment	
All cases	<ul style="list-style-type: none"> • safety glasses with side shields • gloves • disposable rags • basin or bucket
Cable has never failed and was treated within last 12 months	<ul style="list-style-type: none"> • heavy rubber mat • Portable eyewash
It is not possible to be sure cable to be cut is grounded	<ul style="list-style-type: none"> • class C fire extinguisher (CO2 or dry-chemical) • remote spiking or remote actuator for cable cutter



Caution: Working around energized high-voltage systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling high-voltage electrical equipment. De-energize, test and ground all electrical systems before proceeding.

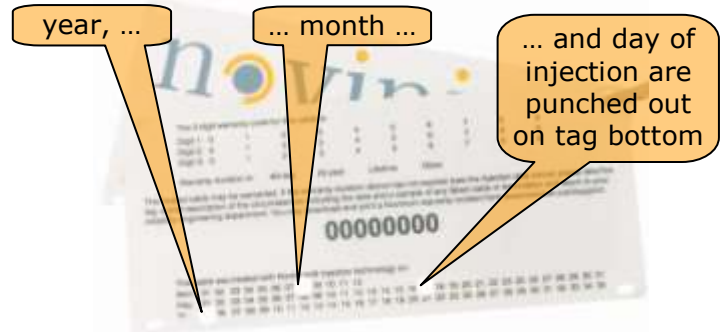


Caution: Remove all possible sources of ignition when working with fluids.

1. Determine the maximum quantity of fluid, which will leak from the intended cut:
 - a. Determine the conductor size from circuit owner records or printing on the cable exterior. Utilize the table to the right to determine the number of strands. Record the number of strands. (e.g. 7, 19, 37 or 61)

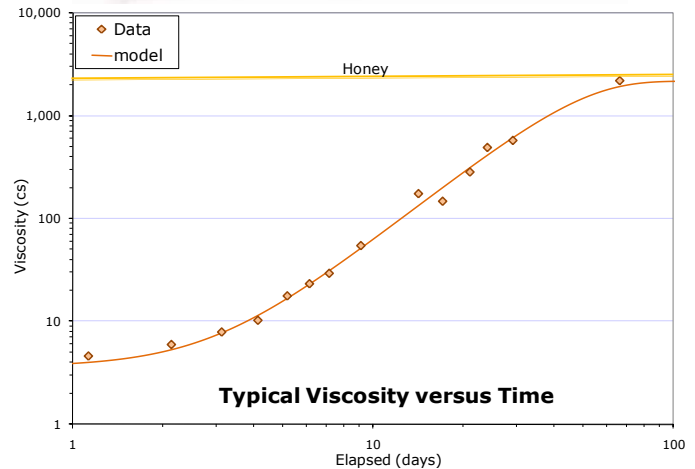
U.S. Conductor	IEC Conductor	Number of Strands
No.2 AWG or smaller	50 mm ² or smaller	7
No.1 to 4/0 AWG	60-150 mm ²	19
250-500 kcm	185-300 mm ²	37
600-1000 kcm	400-800 mm ²	61

b. Examine the injection tag back and determine the date the cable was injected.



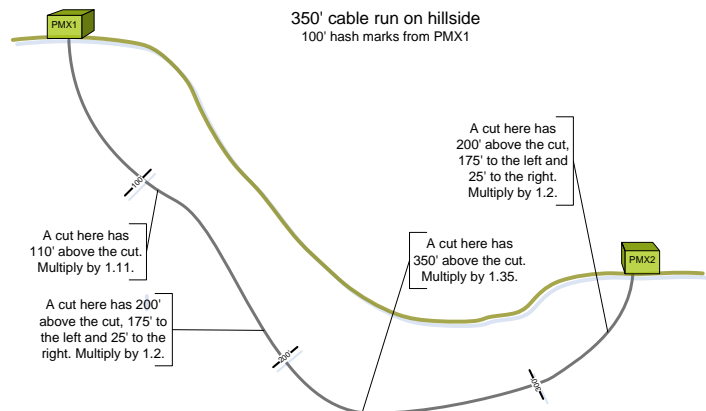
c. If the cable was injected in the last 30 days multiply the number of strands from step 1.a by 2.

- The interstitial pressure of the fluid in the strands decreases with time since injection.
- Fluid permeates into the cable insulation over time.
- The viscosity of the fluid increases with time since injection. All three of these factors reduce the flow rate of fluid from a cut cable.



Fluid does not solidify but its viscosity increases in several months to a consistency similar to honey.

d. If the intended cut in the cable is near the bottom of a slope, increase the value determined in step 1.c by 10% for each 100 feet (30 meters) which lie above the proposed cut.



e. If the cable has failed divide the number determined in step 1.d by 2 as some fluid will have leaked from the failure. This is the number of milliliters (ml) of fluid, which can be expected to leak from the cut.
(237 ml = 1 U.S. cup)

2. Place a catch basin, disposable rags, or a bucket large enough to capture the quantity of fluid calculated in step 1 underneath the cable where the cut is to be made.



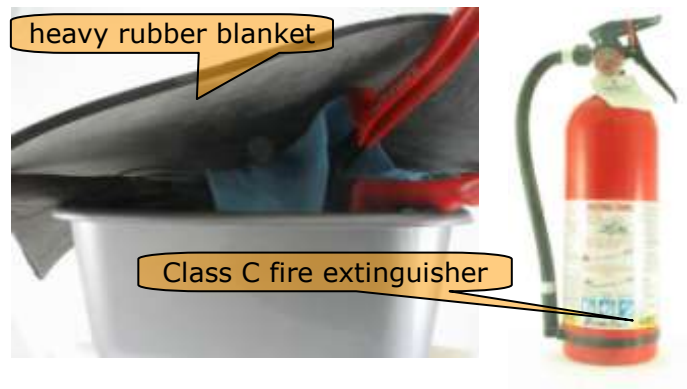
3. Position spiking tool or cutters to make the cut. Use only remotely operated cutters or a spiking tool where it is not possible to ground the cable.




4. Drape a rag over the cutting tool to intercept and absorb any small streams of fluid.



5. If spiking or cutting an energized cable cannot be absolutely ruled out, operate remotely and ...
 - a. Drape a heavy rubber blanket over the rag to contain any small blast from a potentially energized cable.
 - b. Position a Class C (CO₂ or dry-chemical) fire extinguisher within easy reach.



6. **Stop** to confirm that no people, property, or excess equipment are near the cable to be spiked or cut. Insure that anyone within a 30 foot radius of the cutting location has safety glasses with side shields. If an energized cable cannot be positively ruled out operate the cutting or spiking tool remotely and have a Class C fire extinguisher handy. Eliminate all possible sources of ignition within 30 foot radius.

- Area clear
- Safety glasses
- Rag over tool
- Rubber over rag
- Class C fire extinguisher
- Eliminate ignition sources
- No smoking 

7. Cut or spike the cable.



8. Small quantities of fluid can be absorbed on rags and disposed of in dumpsters. Where the quantity is too large to practically absorb with rags, the non-hazardous Novinium fluid may be combined with hazardous wastes for incineration or landfill. Do not pour fluid into storm or sanitary drains.



9. If the cable is within the Novinium warranty period follow the instructions in NRI-93, "Failure Sample Handling" to collect and forward a sample to Novinium.



10. For best post-repair performance the cable should be spliced or terminated with patented Novinium™ brand injection adaptors. If the cable was treated more than 1 year ago, conventional splices may be installed. Contact Novinium customer service with any questions at 206-529-4828.



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